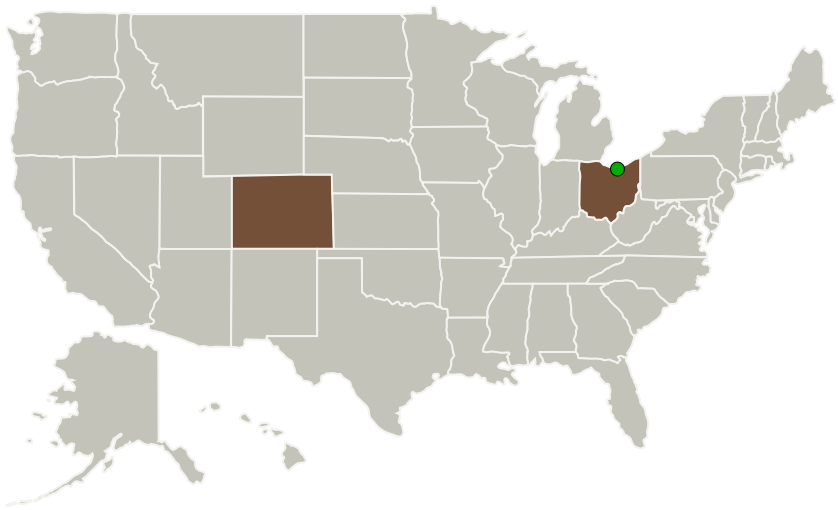
200W Deep Space CubeSat Composite Beam Roll-Up Solar Array (COBRA), Phase II

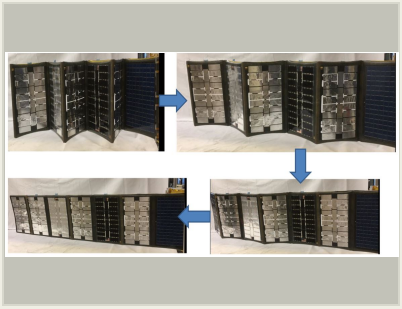
Completed Technology Project (2017 - 2019)

Project Introduction

Solar arrays that have very high specific power (W/kg) and compact stowed volume (W/m3), while still providing shielding to the solar cell, are an enabling technology for Deep Space CubeSat missions. Current CubeSat and small satellite solar arrays employ either fixed panels mounted directly to the Satellite side-wall(s) or small hinged rigid panels. These arrays generate very low power (4-20W) due to the limited area available for solar cell installation, thereby constraining CubeSat payload capacity, capability and mission applications. Composite Technology Development, Inc. (CTD) proposes to develop an approach for a high-power, flexible and compact deployable solar array for Deep Space CubeSat Applications. The Composite Beam Roll-up Array (COBRA) is a very high specific power solar array that combines the Photovoltaic Assembly with the deployable boom structure into a unified integrated laminated assembly that can achieve >265 W/kg at the array level, including the deployable structure. The integrated structure will also shield the solar cells from the harsh space environment. The objective of this SBIR is to develop a COBRA for a 6U Spacecraft that generates at least 200W for Deep Space Applications. The unique design is also inherently low cost due to the design simplicity and very low part count. Furthermore, the COBRA technology is highly modular and scale-able, and could be easily scaled to provide in excess of 600W for a small satellite.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Composite Technology Development, Inc.	Lead Organization	Industry	Lafayette, Colorado
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Colorado	Ohio

Project Transitions

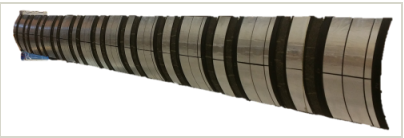
April 2017: Project Start

April 2019: Closed out

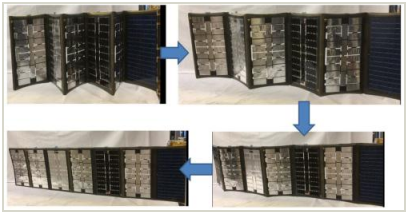
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140835)*

Images



Briefing Chart Image
200W Deep Space CubeSat Composite Beam Roll-Up Solar Array (COBRA), Phase II Briefing Chart Image
(https://techport.nasa.gov/image/130585)



Final Summary Chart Image
200W Deep Space CubeSat Composite Beam Roll-Up Solar Array (COBRA), Phase II
(https://techport.nasa.gov/image/133463)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Composite Technology Development, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

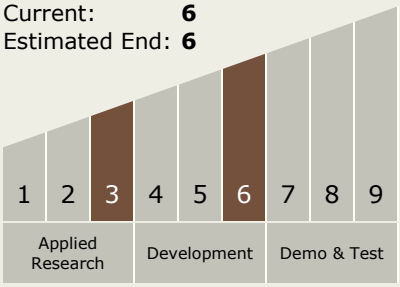
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Alexi Rakow

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



200W Deep Space CubeSat Composite Beam Roll-Up Solar Array (COBRA), Phase II

Completed Technology Project (2017 - 2019)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System